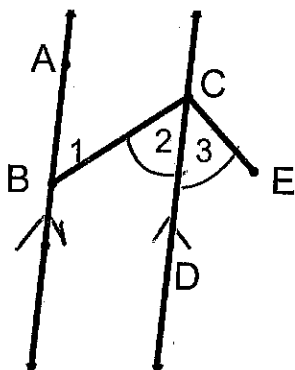


Name Key

Date _____

Parallel Line Proofs—202

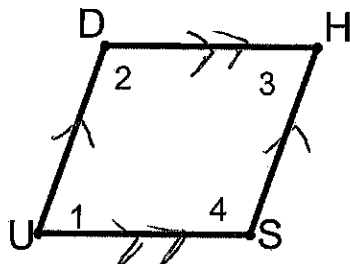
1. Given: $\overline{AB} \parallel \overline{CD}$
 \overline{CD} bisects $\angle BCE$
 Prove: $\angle 1 \cong \angle 3$



Statements	Reasons
① ~	① Given
② $\angle 2 \cong \angle 3$	② Def of \angle bis
③ $\angle 2 \cong \angle 1$	③ \parallel , Alt. int \angle s \cong
④ $\angle 1 \cong \angle 3$	④ Subst

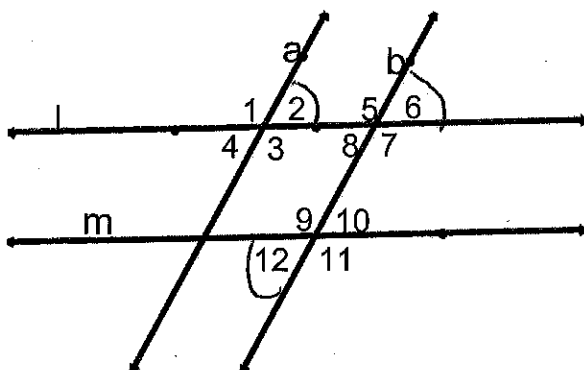
2. Given: $\overline{UD} \parallel \overline{HS}$

Prove: $\angle 1 \cong \angle 3$



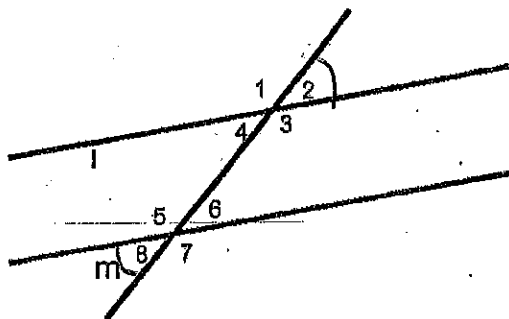
Statements	Reasons
① ~	①
② $\angle 1 + \angle 4$ suppl $\angle 3 + \angle 4$ suppl	② \parallel , cons. \angle suppl
③ $\angle 1 \cong \angle 3$	③ Suppl. of $\cong \angle$ s \cong

3. Given: $a \parallel b$; $l \parallel m$
 Prove: $\angle 2 \cong \angle 12$



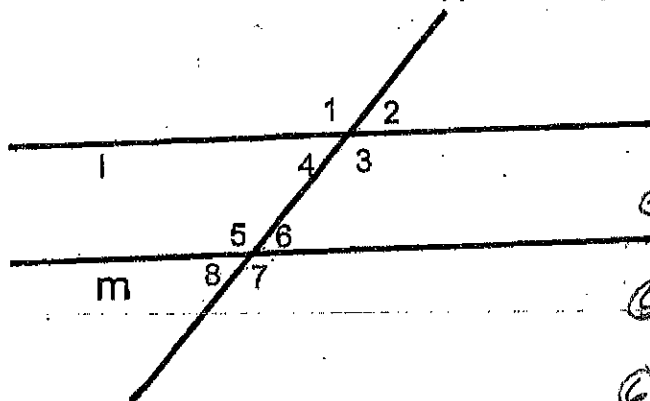
Statements	Reasons
① ~	① Given
② $\angle 2 \cong \angle 6$	② \parallel , corr \angle s \cong
③ $\angle 6 \cong \angle 12$	③ \parallel , Alt. ext \angle s \cong
④ $\angle 2 \cong \angle 12$	④ Transitive

4. Given: $l \parallel m$
 Prove: $\angle 3$ and $\angle 8$ are supplementary.



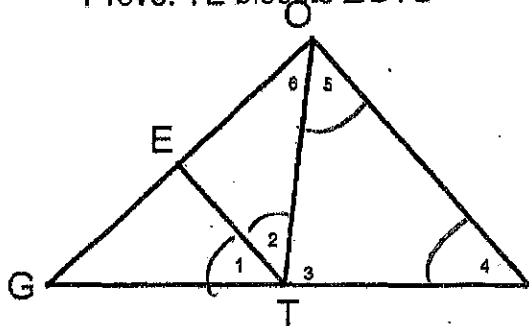
Statements	Reasons
① $l \parallel m$	① Given
② $\angle 3 + \angle 2$ are suppl.	② Suppl. thm
③ $m\angle 3 + m\angle 2 = 180$	③ def of suppl.
④ $\angle 2 \cong \angle 8$	④ If \parallel , alt exts \cong
⑤ $m\angle 2 = m\angle 8$	⑤ def of \cong
⑥ $m\angle 3 + m\angle 8 = 180$	⑥ subst
⑦ $\angle 3 + \angle 8$ are suppl.	⑦ def of suppl.

5. Given: $l \parallel m$
 Prove: $\angle 2$ and $\angle 7$ are supplementary



Statements	Reasons
① $l \parallel m$	① Given
② $\angle 4 + \angle 5$ are suppl.	② If \parallel , s-side intes suppl
③ $m\angle 4 + m\angle 5 = 180$	③ def of suppl
④ $\angle 4 \cong \angle 2$ $\angle 5 \cong \angle 7$	④ Vertes \cong
⑤ $m\angle 4 = m\angle 2$ $m\angle 5 = m\angle 7$	⑤ def of \cong
⑥ $m\angle 2 + m\angle 7 < 180$	⑥ subst
⑦ $\angle 2 + \angle 7$ are suppl.	⑦ def of suppl.

6. Given: $\overline{ET} \parallel \overline{MO}$; $m\angle 4 = m\angle 5$
 Prove: \overline{TE} bisects $\angle GTO$



Statements	Reasons
① $\overline{ET} \parallel \overline{MO}$ $m\angle 4 = m\angle 5$	① Given
② $\angle 5 \cong \angle 2$	② If \parallel , alt intes \cong
③ $\angle 4 \cong \angle 1$	③ If \parallel , corr \angle s \cong
④ $\angle 1 \cong \angle 2$	④ Subst
⑤ \overline{TE} bisects $\angle GTO$	⑤ def of \angle bis.

3-2 Study Guide and Intervention (continued)

Angles and Parallel Lines

Algebra and Angle Measures Algebra can be used to find unknown values in angles formed by a transversal and parallel lines.

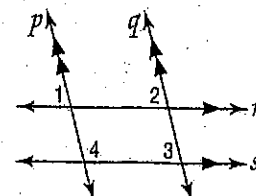
Example If $m\angle 1 = 3x + 15$, $m\angle 2 = 4x - 5$, $m\angle 3 = 5y$, and $m\angle 4 = 6z + 3$, find x and y .

$p \parallel q$, so $m\angle 1 = m\angle 2$
because they are
corresponding angles.

$$\begin{aligned} 3x + 15 &= 4x - 5 \\ 3x + 15 - 3x &= 4x - 5 - 3x \\ 15 &= x - 5 \\ 15 + 5 &= x - 5 + 5 \\ 20 &= x \end{aligned}$$

$r \parallel s$, so $m\angle 2 = m\angle 3$
because they are
corresponding angles.

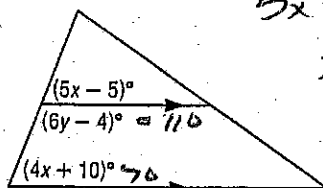
$$\begin{aligned} m\angle 2 &= m\angle 3 \\ 75 &= 5y \\ \frac{75}{5} &= \frac{5y}{5} \\ 15 &= y \end{aligned}$$



Exercises

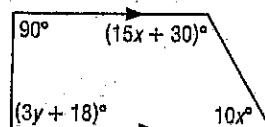
Find x and y in each figure.

1.



$$\begin{aligned} 5x - 5 &= 4x + 10 \\ x &= 15 \\ 6y &= 114 \\ y &= 19 \end{aligned}$$

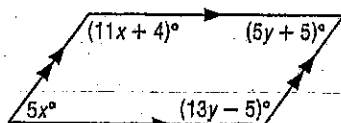
2.



$$\begin{aligned} 25x + 180 &= 180 \\ 25x &= 180 \\ x &= 6 \end{aligned}$$

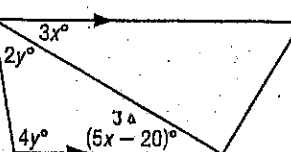
$$\begin{aligned} 3y + 18 &= 90 \\ 3y &= 72 \\ y &= 24 \end{aligned}$$

3.



$$\begin{aligned} 18y &= 180 \\ y &= 10 \end{aligned}$$

4.

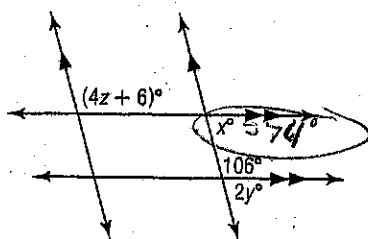


$$\begin{aligned} 5x - 20 &= 3x \\ -2x &= -20 \\ 10 &= x \end{aligned}$$

$$\begin{aligned} 6y + 130 &= 180 \\ 6y &= 50 \\ y &= 25 \end{aligned}$$

Find x , y , and z in each figure.

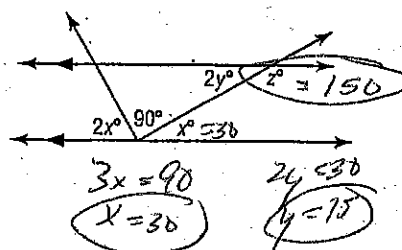
5.



$$\begin{aligned} 2y &= 74 \\ y &= 37 \end{aligned}$$

$$\begin{aligned} 4z + 6 &= 106 \\ 4z &= 100 \\ z &= 25 \end{aligned}$$

6.



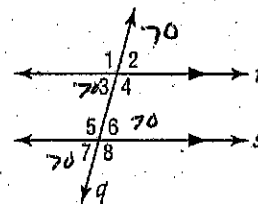
$$\begin{aligned} 3x &= 90 \\ x &= 30 \end{aligned}$$

$$\begin{aligned} 2y &= 30 \\ y &= 15 \end{aligned}$$

3-2 Skills Practice Angles and Parallel Lines

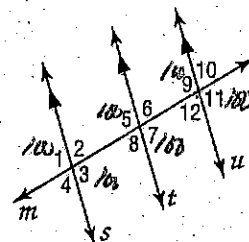
In the figure, $m\angle 2 = 70$. Find the measure of each angle.

1. $\angle 3$ 70
2. $\angle 5$ 110
3. $\angle 8$ 110
4. $\angle 1$ 110
5. $\angle 4$ 110
6. $\angle 6$ 70



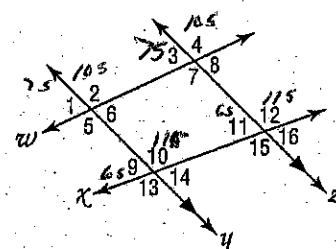
In the figure, $m\angle 7 = 100$. Find the measure of each angle.

7. $\angle 9$ 100
8. $\angle 6$ 80
9. $\angle 8$ 80
10. $\angle 2$ 80
11. $\angle 5$ 100
12. $\angle 11$ 100

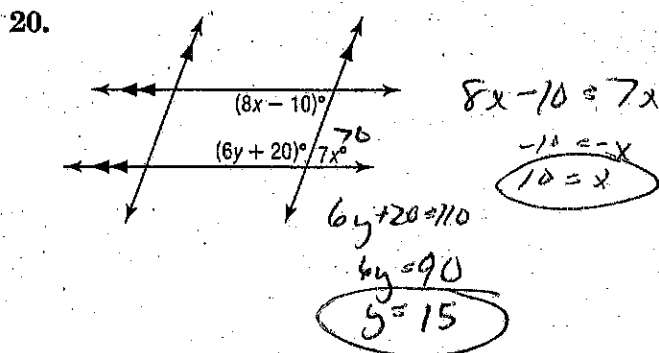
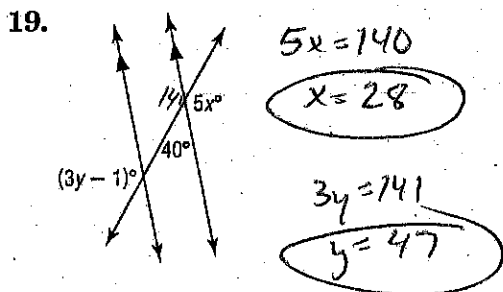


In the figure, $m\angle 3 = 75$ and $m\angle 10 = 115$. Find the measure of each angle.

13. $\angle 2$ 105
14. $\angle 5$ 105
15. $\angle 7$ 105
16. $\angle 15$ 115
17. $\angle 14$ 65
18. $\angle 9$ 65



Find x and y in each figure.



Find $m\angle 1$ in each figure.

